PM FCS — Testing Underway for FCS Network

Richard Condello

Recently, on the training ranges at Fort Bliss, TX, squads of Soldiers conducted urban operations in search of enemy high-value targets. This was no ordinary training exercise — Soldiers moved quickly through the "town" using small ground robots, unmanned air vehicles, and unattended sensors — all linked by the power of the Future Combat Systems (FCS) Network.

The U.S. Army FCS(BCT)'s first FCS MGV was publicly unveiled on The National Mall, Washington, DC, June 11, 2008. (U.S. Army photo by Robert E. Coultas.)

The urban operations exercise allows the Fort Bliss Soldiers to evaluate FCS capabilities during its phase one roll out. The FCS Network comprises many components. The network includes hardware (radios and touch screens), software (System-of-Systems Common Operating Environment and Battle Command), and all of the FCS platforms.

The best way to show how the FCS Network functions is to describe an operational example. Consider an Unattended Ground Sensor (UGS) that is deployed and detects an enemy vehicle. This information is automatically relayed to a Manned Ground Vehicle (MGV) over a Joint Tactical Radio System (JTRS) radio where the battle command application in the MGV fuses the sensor hit with other potential tracks, classifies the enemy vehicle, and updates the Common Operational Picture (COP) with a threat warning. The COP update is transported over the JTRS and Warfighter Integrated Network-Tactical (WIN-T) across the brigade. Based on this threat, received in the COP of a commander's vehicle, a decision is made to destroy the target.

The battle command services within the MGV provide the warfighter with numerous planning tools to determine the proper course of action. Destroying the threat using the Non-Line-of-Sight-Cannon (NLOS-C) fire is a course of action, so the order is transmitted to take out the threat using an NLOS-C. The order to fire the NLOS-C is transferred over the JTRS and WIN-T to an NLOS-C vehicle, which then fires on the target. The commander then directs a Class IV Unmanned Air System over the target and employs the sensors onboard to make an assessment. The sensor video data is downlinked via a WIN-T waveform into a multitude of platforms (MGVs) where an assessment is made,

MAJ Ralph Overland illustrates the user-friendly COP at the NLOS-C NetFires Demonstration on June 13, 2008, at the Pentagon. (U.S. Army photo by Jill Nicholson, FCS.)

and the images taken by the Class IV are appended to and distributed across the brigade COP.

In this scenario, the entire mission would take just a few minutes. But in today's warfight, it would take much longer. Additionally, not all brigade levels would be able to share the sensor information on the COP, since the systems and platforms fielded today are either stand-alone (i.e., non-networked) stovepipe systems to fill a specific need, or have incorporated networking capabilities as an afterthought. The FCS approach recognizes the importance of the integrated network from the start and builds the network components into the platforms. Because every platform, sensor, and Soldier is networked, leaders at all levels can see first, understand first, act first, and finish decisively. One of the major improvements is that a robust network is pushed further down in echelons and in greater density than today.

Today's robust network stops at the battalion level. Eventually, FCS will push the network down to the individual Soldier. This will include integrating within each platform a significantly greater transport capacity than what exists today, while operating on the move. Integrated within every MGV is the computing power to run the full battle command services. This battle command can be customized based on the warfighter's role. Customization will reduce the burden on the warfighter by increasing automated processes and decision tools, and permits any Soldier, regardless of his role, to perform his battle command functions from any platform.

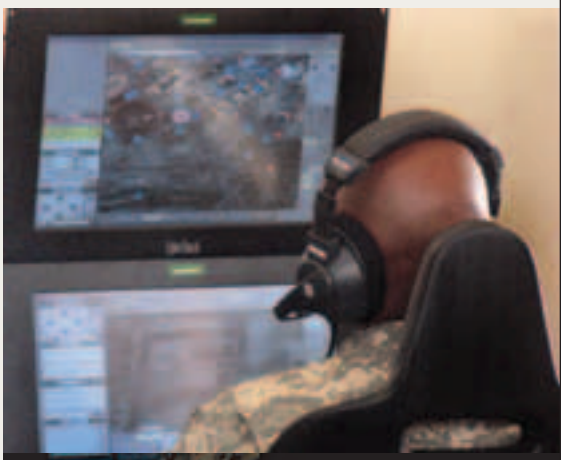
> There are five layers to the FCS Network: sensors/platforms, applications, services, transport, and standards.

Contrast this with today's capability where the predominant battle command functions are performed at the halt within the battalion and brigade command posts. The FCS Network also adds a significant density of sensors organic to the brigade combat team (BCT) that are integrated on the manned and unmanned vehicles.

Besides battle command information, the network also provides other tools and information. For instance, Soldiers can perform training operations in real time from any networked location, even while in their vehicles. Vehicles, themselves, will also be smarter. Both manned and unmanned vehicles will have embedded diagnostics. This diagnostic and maintenance information will be sent via the network to vehicle operators and maintainers, which will help mechanics better plan what services to perform and allow for less vehicle downtime.

Network Layers

Each of these tools, along with the platforms, software, and hardware, are broken down and described as the FCS Network layers. This layered approach is a new way to develop network connectivity and information transmission. There are five layers to the FCS Network: sensors/platforms,



A Soldier completes training in the Command and Control Vehicle Surrogate in June 2008 in preparation for the NLOS-C NetFires Demonstration. (U.S. Army photo by Jill Nicholson, FCS.)

Here, an AETF Soldier tests the Warrior Machine Interface in combination with the UGS and Small UGV during Spin Out test and evaluation at Fort Bliss in spring 2008. (U.S. Army photo by Michael Satchfield, FCS.)

applications, services, transport, and standards. The integration of all five layers enables greater situational awareness (SA), sensor fusion, and networked fires, thereby transforming the ground forces' ability to dominate in land combat.

Recognition of the network's five layers is important since, historically, the network has been referred to as "routers and radios" and has resulted in decoupled development of the applications from the radios. For the Army, the past approach creates challenging, after-the-fact integration, and, ultimately, suboptimal performance for the warfighter. The layered approach recognizes that the network is more than just the radios, and the sensors and battle command software must be developed in concert with the transport.

The FCS Network is being developed in four phases. FCS has rolled out phase one, which is currently being evaluated by Soldiers at Fort Bliss. Phases two and three are currently being built and tested. The full network will be online in time for FCS brigade fielding in the 2015 timeframe. This phased approach allows us to bring Soldier users into the development process, and the real-time feedback will allow developers to make changes that Soldiers need, allowing for a more useable end product. The phased approach also allows the Army to transfer network technology into the hands of warfighters as the technology matures. Soldiers today are evaluating FCS Network technology as part of FCS Spin Out to Infantry BCTs.

This unmatched SA will not only assist Soldiers in their training and missions; it will also save Soldiers' lives.

Industry Partners

The Army is using the best of industry approach in designing the FCS Network, while also developing the hardware that the network will plug into simultaneously. There are a number of industry teams working network development. For example, the battle command development team is comprised of different partners across industry including Overwatch Systems, BAE Systems, Lockheed Martin, Honeywell, Sparta, Boeing, and Raytheon, among others. The transport is predominantly performed by General Dynamics and Boeing. In addition, the program includes other industry partners with specific areas of expertise to perform independent analysis of the program in support of network development. In fact, the network could not get into the hands of Soldiers as quickly as it has without this industry team in place.

Soldiers at the Army Evaluation Task Force (AETF) at Fort Bliss are becoming believers in the unmatched SA the FCS Network gives them on the battlefield. "It is the combination of the unmanned ground vehicles (UGVs), unmanned aerial vehicles, and UGSs with the network that makes the FCS(BCT) so beneficial. It gives Soldiers early warning and unmatched SA. These systems will save Soldiers' lives," one AETF commander said. A sergeant added, "With the FCS Network you are able to see where everyone is without having to talk on your radio once."

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